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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,931	06/07/2005	Jarmo Hiipakka	915-007.145	8654

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EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2615

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/537,931

Applicant(s)

HIIPAKKA ET AL.

Examiner

Walter F. Briney III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>06/07/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. **Claim 10 is directed to non-statutory subject matter.**

Claim 10 is limited to "a software program product comprising a software code, stored on a readable medium, for an audio processing component. The two components of this program product are the readable medium and the set of instructions—both real-time functions and control functions. Since the readable medium is not a computer-readable medium encoded with instructions that when executed by a processor cause the processor to execute real-time functions and control functions, this claim is directed solely to a readable listing of instructions, which is non-tangible subject matter and not patentable under 35 USC 101.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. **Claims 1, 2, 7, 8¹⁰ and 14 are rejected under 35 U.S.C. 102(a) as being anticipated by Vehmanen (Design of Low Latency Audio Software for General Purpose Operating Systems, University of Turku, Master's Thesis, December 2002).**

Claim 1 is limited to “an audio processing system.” In rejecting this claim reference is made to the Master’s Thesis of Kai Vehmanen (herein Vehmanen). Vehmanen discloses a design of low latency audio software for general purpose operating systems. In overview, the audio processing software is a two-state system that either waits for the sound card produces/consumes audio data. See page 36, section 6.2. The audio processing is to be done in real-time using only deterministic execution. See page 40, section 6.3.3. To ensure deterministic execution, code is separated into real-time and non-real-time parts. See page 44, section 6.5. In placing the real-time boundary, Vehmanen discloses separating the processes that either create or consume a block of audio data from other tasks, such as user interface and disk i/o handling that can be left outside the real-time code path without loss of functionality. See page 45, section 6.5.1. In other words, Vehmanen discloses “at least one audio processing component with a group of real-time functions” —i.e., a task that creates or consumes an audio block—and “a group of control functions for processing control signals”—i.e., tasks like user interface and disk i/o. One particular “audio processing component” described on page 49, section 6.6.1, is an effect processing software algorithm for use in a media player that is able to be changed by the user. In executing software, there is inherently “at least one processor.” Moreover, the separation of real-time and non-real-time tasks requires that the processor includes “a first process for executing real-time functions of said at least one audio processing component” and “at least one further process for executing control functions of said at least one audio processing component whenever needed without affecting the

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processing power employed for said first process.” In fact, on page 50, Vehmanen discloses using multiple threads for the separate execution contexts. It is further noted that real-time functions inherently use “a basically constant processing power.” Finally, Vehmanen’s design requires that the non-real-time functions do not block the real-time functions. This corresponds to “executing control functions...whenever needed without affecting the processing power employed for said first process.” See page 50: *“the user interface must be implemented in such a way that it in no condition can block the audio processing logic.”* Therefore, Vehmanen anticipates all limitations of the claim.

Claim 2 is limited to “the audio processing system according to claim 1,” as covered by Vehmanen. On pages 49 and 52, Vehmanen discloses a media player with the ability to change the effect algorithm used—i.e., there is more than one effect algorithm. As a reminder, the effect algorithm was shown apropos the rejection of claim 1 to be an audio processing component complete with real-time functions for producing/consuming audio data user input functions that enable changing the signal processing parameters of the effect. In this way, Vehmanen discloses “a plurality of audio processing components.” The means by which the disclosed media player allows selection of the disclosed audio effects corresponds to the recited “audio processing engine for selecting successively one of said audio processing components.

This claim further recites that the at least one processor executes real-time functions and control functions in two separate dedicated parts. As shown apropos the rejection of claim 1, Vehmanen discloses using separate threads for real-time and control functions, the threads corresponding to the recited “dedicated part of said first

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process" and "dedicated part of said at least one further process." Therefore, Vehmanen anticipates all limitations of the claim.

Claim 14 is limited to "the audio processing system according to claim 1," as covered by Vehmanen. Vehmanen discloses using execution threads on page 50: "[a] common way to provide separate execution contexts is to use multiple threads." Therefore, Vehmanen anticipates all limitations of the claim.

Claims 7 and 8 are limited to "a method of operating an audio processing system." The steps recited are inherently performed by the audio processing system disclosed by Vehmanen as shown apropos the rejections of claims 1 and 2. Therefore, Vehmanen anticipates all limitations of the claim.

Claim 10 is limited to "a software program product comprising a software code, stored on a readable medium, for an audio processing component." This program product was shown apropos the rejection of claim 1 to be disclosed by Vehmanen. In particular, Vehmanen discloses "real-time functions" and "control functions." Therefore, Vehmanen anticipates all limitations of the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3, 5, 6, 9, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vehmanen in view of Adams (US Patent Application Publication 2003/0017808 A1).

Claim 3 is limited to "the audio processing system according to claim 2," as covered by Vehmanen. In rejecting this claim reference is made to US Patent Application Publication 2003/0017808 A1 (herein Adams). The control functions disclosed by Vehmanen generate events, such as an event to change a signal processing parameter or possibly events to start, stop or vary the playback position of an audio track. See page 49, section 6.6.1. The events generated are transmitted as messages to the real-time thread as seen in figure 7.1 on page 53. In this way, the real-time functions "are designed for using said events...when said real-time functions are executed in said first process." It is noted, however, that Vehmanen fails to disclose "time-stamping said events" and, hence, "using said events at a time defined by said time stamps." Instead, Vehmanen simply discloses queuing messages between the control thread and the real-time thread. See page 55 on non-blocking communication with other subsystems. Yet this deficiency is overcome by an obvious modification.

In particular, Adams teaches a software partition of a MIDI synthesizer for host/DSP (OMAP) architecture. The architecture of Adams focuses on the separation of control and real-time functions just as described by Vehmanen. See paragraph [0018]. Figure 2 of Adams provides an actual implementation of a MIDI synthesizer that goes beyond the more general case study of a media player presented by Vehmanen in chapter 7, serving as a crystallized example of how Vehmanen's design principles set forth on page 35 would obviously be embodied. More specifically, a MIDI bitstream is opened, loaded and parsed by the control thread. The control thread instructs the real-

time synthesis thread to consume the parsed bitstream made available as a time-stamped MIDI event. See paragraph [0019].

It would have been obvious to one of ordinary skill in the art at the time of the invention to embody the audio processor of Vehmanen as a MIDI synthesizer as taught by Adams requiring time-stamping of control events that are then processed in a separate real-time audio processing thread for the purpose of providing MIDI synthesis in a distributed non-blocking architecture.

Claim 5 is limited to "the audio processing system according to claim 3," as covered by Vehmanen in view of Adams. The embodiment of Adams uses "a first processor" 20 and "a second processor" for the first process and the further process respectively. Therefore, Vehmanen in view of Adams makes obvious all limitations of the claim.

Claim 6 is limited to "the audio processing system according to claim 5," as covered by Vehmanen. As seen in figure 1 of Adams, the processes executed by processors 12 and 20 are "execution threads." Therefore, Vehmanen in view of Adams makes obvious all limitations of the claim.

Claim 11 is limited to "the audio processing system according to claim 1," as covered by Vehmanen. This claim is rejected mutatis mutandis for the same reasons presented apropos the rejection of claim 3. Therefore, Vehmanen in view of Adams makes obvious all limitations of the claim.

Claim 13 is limited to "the audio processing system according to claim 1," as covered by Vehmanen. Vehmanen does not disclose whether one or two processors

are used for the multiple execution threads. However, the examiner takes Official Notice of the fact that the use of two processors for multiple threads was well known at the time of the invention. See, for example, Adams. Therefore, it would have been obvious to implement a multiply-threaded program using two processors.

Claim 9 is limited to "the according to claim 8," as covered by Vehmanen. The steps recited in this claim are inherently performed by the audio processing system taught by the combination of Vehmanen and Adams as shown apropos the rejection of claim 3. Therefore, Vehmanen in view of Adams makes obvious all limitations of the claim.

Claim 15 is limited to "the according to claim 7," as covered by Vehmanen. The steps recited in this claim are inherently performed by the audio processing system taught by the combination of Vehmanen and Adams as shown apropos the rejection of claim 3. Therefore, Vehmanen in view of Adams makes obvious all limitations of the claim.

4. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Vehmanen in view of Adams and further in view of Belhaj (US Patent 6,564,179 B1).

Claim 4 is limited to "the audio processing system according to claim 3," as covered by Vehmanen. Adams explicitly teaches the use of multiple processors, while the claim requires that "said at least one processor is a single processor providing said first process and said at least one further process." Belhaj, however, teaches that pairing down from two processors to the use of one processor is obvious.

To wit, Belhaj reviews the concept of using two processors: one as a controller and the second as a DSP. See column 1, lines 12-23. Belhaj continues in teaching that reduced cost and smaller size demands prefer the use of a single processor. As such, Belhaj teaches embodying the control functions on the same processor as the DSP. See column 1, lines 57-67, and column 2, lines 1-34.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the multiple processor architecture of Adams with a single processor to reduce cost and size requirements, which is particularly important in wireless phones, such as taught by Adams. See paragraph [0004] of Adams.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vehmanen in view of Belhaj.

Claim 12 is limited to "the audio processing system according to claim 1," as covered by Vehmanen. Vehmanen does not disclose whether one or two processors are used for the multiple execution threads. However, the examiner takes Official Notice of the fact that the use of one processor multiple threads was well known at the time of the invention. See, for example, Belhaj. Therefore, it would have been obvious to implement a multiply-threaded program using a single processor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SUPERVISORY PATENT EXAMINER